

Space Weather Forecast

Issued on Tuesday, 23 July 2024 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Slight Chance of Minor Geomagnetic Storm G1 today. Moderate G2 likely in UTC day of Wednesday 24 July, chance of Strong G3. Minor radio blackouts R1 likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity as measured at GOES16 was Moderate, with Moderate-class flare observed at 22/1300 UTC, which originated from an ex-region, which is now located just beyond the west limb.

There are currently up to nine regions on the solar disc, with two newly numbered regions rotating onto the eastern solar horizon in the period. Only slow and modest changes were observed in the past 24 hours.

There was a narrowly far-sided event from the southeastern limb that dominated coronagraph imagery during the UTC evening. This feature plays no part in the forecast. This was shortly followed by a very large full halo Coronal Mass Ejection (CME) from the far-side of the Sun, which produced the current and on-going minor (S1) proton storm event. Another CME was observed at 23/0400 UTC off the southwest limb, which was associated with a low-level Common-class flare, which has been analysed for any potential Earth-directed components - pending results. Otherwise, no new Earth-directed were observed in coronagraph imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind otherwise showed a continuation of a slow regime, albeit with an unusually stable and anti-aligned (with Earth's field) magnetic field component, showing a gradual rise to become slightly elevated into the UTC evening. Solar winds remained at background levels.

The net result of the above solar wind measures was for mostly Quiet (Kp0-2) geomagnetic indices, with an Unsettled (Kp3) interval observed 22/1800-2100UTC.

Energetic Particles / Solar Radiation: Radiation levels reached S1/Minor Storm threshold in response to the very large full halo CME from the far-side of the Sun early in the UTC day.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely throughout. While a particularly active sunspot region has now departed the facing side, its loss is in some way compensated for by the flaring into life of a second group in the southeast.

Solar Wind /Geomagnetic Activity: Two CMEs are expected - the first from a filament eruption that left the Sun on 19 July which is due inside the first 24 hours - although there is currently no evidence in solar wind data of its arrival, if it does arrive, it may give Unsettled or Active
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intervals, with slight chance of G1.

Secondly, a full-halo CME that left the Sun on 21 July from the immediate east of AR3757 is due in the early hours of 24 July. This is Likely to give G2 conditions, with a Chance of G3 in the UTC day of 24 July. A gradual decline to Quiet geomagnetic activity is then expected into the second half of the UTC working week, barring new CMEs.

Energetic Particles / Solar Radiation: Current above threshold radiation storm levels (S1) should gradually decline to background levels by day 2 (24 July). Slight Chance of rising back above the S1/Minor Storm threshold in response to any notable flares - perhaps now increasingly likely from the active sunspot region southeast as it tracks westwards.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	50	70	20	1
Strong	G3	No	10	30	1	1
Severe	G4	No	1	2	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	Yes	99	20	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						